SEQUENCE LISTING

<110> SHIRE BIOCHEM INC.

<120> POLYPEPTIDES OF STREPTOCOCCUS PYOGENES

<130> 51564-44

<140> PCT/CA2004/001510
<141> 2004-08-16

<150> US 60/495,094
<151> 2003-08-15

<160> 44

<170> PatentIn version 3.3

<210> 1
<211> 537
<212> DNA
<213> Streptococcus pyogenes

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attgaaatca aagttgaagg gactgaaatc acagttgtac gtcctaacga ctcaaaagaa 180

atgaaaacaa tccatggtac aacccgtgct aacttgaata acatggttgt aggtgtttct 240

gaaggtttca aaaaagatct tgaaatgaag ggtgtcggtt accgtgctca acttcaaggt 300

actaaacttg tcctttcagt aggtaaatct caccaagacg aagttgaagc tccagaagga 360

attactttca ctgttgctaa cccaacttca atctcagttg aaggaatcaa caaagaagtt 420

gttggtcaaa cagctgctta catccgtagc ttgcgttcac cagagcctta caaaggcaaa 480

gggatccgtt acgttggtga atacgtacgc cttaaagaag gtaaaacagg taaataa 537

<210> 2
<211> 178
<212> PRT
<213> Streptococcus pyogenes

<400> 2

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1 5 10 15

Leu Thr Asn Asn Asn Asn Val Ile Thr Val Lys Gly Pro Lys Gly Glu
20 25 30

Leu Thr Arg Glu Phe Asn Lys Asn Ile Glu Ile Lys Val Glu Gly Thr
35 40 45

Glu Ile Thr Val Val Arg Pro Asn Asp Ser Lys Glu Met Lys Thr Ile
50 55 60

His Gly Thr Thr Arg Ala Asn Leu Asn Asn Met Val Val Gly Val Ser
65 70 75 80

Glu Gly Phe Lys Lys Asp Leu Glu Met Lys Gly Val Gly Tyr Arg Ala
85 90 95

Gln Leu Gln Gly Thr Lys Leu Val Leu Ser Val Gly Lys Ser His Gln
100 105 110

Asp Glu Val Glu Ala Pro Glu Gly Ile Thr Phe Thr Val Ala Asn Pro
115 120 125

Thr Ser Ile Ser Val Glu Gly Ile Asn Lys Glu Val Val Gly Gln Thr
130 135 140

Ala Ala Tyr Ile Arg Ser Leu Arg Ser Pro Glu Pro Tyr Lys Gly Lys
145 150 155 160

Gly Ile Arg Tyr Val Gly Glu Tyr Val Arg Leu Lys Glu Gly Lys Thr
165 170 175

Gly Lys

<210> 3
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<212> DNA
<213> Streptococcus pyogenes

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tctagtgtca acaaagtaaa agccttaacc ataaaagaag ccatggaaca aggaaaagat 180

atcagcttga ccttagctgg cgaagtaaca gctaacaaca gcagcaaagt caaaatcgac 240

tcaagtaaag gagaagtcaa agaggtcttt gttaaaaaag gcgatgttgt caaagtagga 300

caacccttgt ttagctatga aacgtcacag cggttaacgg ctcaaagttc agaatttgat 360

gttcaaacca aagccaatca gctccaagtt gctaaaacca atgcagcatt gaagtgggaa 420

acctacaatc gcaaggtcaa tgaaatcaac accctaaaat ctcgctacaa cactgcacca 480

gatgagagct tactagagca aattcgcagc gcagaagaca gtgtatccca agcactaagc 540

gatgccaaaa cagcagatag cgatgtcaaa accgctcaaa tcgaactcga taaagctaat 600

gctactgcca caacggaaaa aggtaaacta gagtatgaca ccgttaagtc agacaccgca 660

ggaaccattg ttagtctaaa tactgatttg ccaaatcaat caaaatccaa aaaagaaaat 720

gaaactttta tggaaattat cgacaaatca aaaatgttag tcaaaggtaa cattagtgaa 780

tttgaccgtg acaagttaaa aatcggtcaa aaagtcgaag tgattgaccg caaagacaac 840

tctaaaaaat ggactggaaa agtaacccaa gttggcaacc tcaaagcaga ggaaaaaggc 900

caaggtcaag gccaaggtgg caatgaccaa caagataatc caaaccaagc aaaattccct 960

tatgttattg aacttgacca atcagacaag cagccactca ttggctcaca cacctatgtt 1020

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gcagaaaatg gaaaaaccta tgtgtggaaa gttgataaaa acaaggtcaa aaaacaagaa 1140

atcaagacta agcccttctc aaaaggttat gttgaggtaa caagtggctt gactatgcaa 1200

gataagattg ctcagccgct tcctggcatg aaagacggta tggaggtagg aagtattgtt 1260

aaaccttaa 1269

<210> 4
<211> 422
<212> PRT
<213> Streptococcus pyogenes

<400> 4

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Ser Ala Gly Val Leu Thr Cys Val Val Gly Gly Ser Tyr Leu Ile Met
20 25 30

Asn His Gln Gln Gln Glu Ile Val Ser Ser Val Asn Lys Val Lys Ala
35 40 45

Leu Thr Ile Lys Glu Ala Met Glu Gln Gly Lys Asp Ile Ser Leu Thr
50 55 60

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Leu Ala Gly Glu Val Thr Ala Asn Asn Ser Ser Lys Val Lys Ile Asp
65                  70                  75                  80

Ser Ser Lys Gly Glu Val Lys Glu Val Phe Val Lys Lys Gly Asp Val
                85                  90                  95

Val Lys Val Gly Gln Pro Leu Phe Ser Tyr Glu Thr Ser Gln Arg Leu
            100                 105                 110

Thr Ala Gln Ser Ser Glu Phe Asp Val Gln Thr Lys Ala Asn Gln Leu
        115                 120                 125

Gln Val Ala Lys Thr Asn Ala Ala Leu Lys Trp Glu Thr Tyr Asn Arg
    130                 135                 140

Lys Val Asn Glu Ile Asn Thr Leu Lys Ser Arg Tyr Asn Thr Ala Pro
145                 150                 155                 160

Asp Glu Ser Leu Leu Glu Gln Ile Arg Ser Ala Glu Asp Ser Val Ser
                165                 170                 175

Gln Ala Leu Ser Asp Ala Lys Thr Ala Asp Ser Asp Val Lys Thr Ala
            180                 185                 190

Gln Ile Glu Leu Asp Lys Ala Asn Ala Thr Ala Thr Thr Glu Lys Gly
        195                 200                 205

Lys Leu Glu Tyr Asp Thr Val Lys Ser Asp Thr Ala Gly Thr Ile Val
    210                 215                 220

Ser Leu Asn Thr Asp Leu Pro Asn Gln Ser Lys Ser Lys Lys Glu Asn
225                 230                 235                 240

Glu Thr Phe Met Glu Ile Ile Asp Lys Ser Lys Met Leu Val Lys Gly
                245                 250                 255

Asn Ile Ser Glu Phe Asp Arg Asp Lys Leu Lys Ile Gly Gln Lys Val
            260                 265                 270

Glu Val Ile Asp Arg Lys Asp Asn Ser Lys Lys Trp Thr Gly Lys Val
        275                 280                 285
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Thr Gln Val Gly Asn Leu Lys Ala Glu Glu Lys Gly Gln Gly Gln Gly
    290                 295                 300

Gln Gly Gly Asn Asp Gln Gln Asp Asn Pro Asn Gln Ala Lys Phe Pro
305                 310                 315                 320

Tyr Val Ile Glu Leu Asp Gln Ser Asp Lys Gln Pro Leu Ile Gly Ser
                325                 330                 335

His Thr Tyr Val Asn Val Leu Asn Asn Val Pro Glu Ala Gly Lys Ile
            340                 345                 350

Val Leu Lys Glu Thr Phe Thr Met Ala Glu Asn Gly Lys Thr Tyr Val
        355                 360                 365

Trp Lys Val Asp Lys Asn Lys Val Lys Lys Gln Glu Ile Lys Thr Lys
    370                 375                 380

Pro Phe Ser Lys Gly Tyr Val Glu Val Thr Ser Gly Leu Thr Met Gln
385                 390                 395                 400

Asp Lys Ile Ala Gln Pro Leu Pro Gly Met Lys Asp Gly Met Glu Val
                405                 410                 415

Gly Ser Ile Val Lys Pro
            420
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<210> 5
<211> 885
<212> DNA
<213> Streptococcus pyogenes

<400> 5

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gtgaatcagc accctaaaac ggctaaagag actgaacagc agagaattgt agccacttcg    120

gttgctgtgg ttgatatctg tgaccgttta aatttagacc tcgttggggt ttgtgatagt    180

aaattatata cccttcctaa acgctatgat gctgttaagc gtgtgggttt acccatgaat    240

cctgatatag agttgattgc ttctttgaaa ccaacttgga ttttgagtcc caattcttta    300

caagaagatt tggaacccaa gtatcaaaaa ttggatactg agtatggttt tttgaactta    360

cgaagtgttg agggcatgta ccagtccatt gatgatttag ggaacctttt ccaacgtcaa    420

caagaagcaa aagaattgcg ccagcaatac caggactatt atcgtgcttt ccaagctaaa    480
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cgtaagggga agaaaaagcc taaagtgctt attcttatgg gcttgccagg tagttatttg 540

gtggcgacga accaatctta tgtagggaat cttttggact tggcaggtgg tgagaatgtt 600

tatcagtcag atgagaaaga atttctatca gctaatcctg aagacatgct ggctaaggag 660

cctgacttga ttttacgaac agctcatgcc attccagaca aggtaaaagt gatgtttgac 720

aaagaatttg ctgaaaatga tatttggaaa cattttacgg cagtcaagga agggaaagtc 780

tatgatttgg acaataccct gtttggcatg agtgctaaat tgaactaccc agaagccttg 840

gacaccttaa cacagctttt tgaccacgtg ggagatcatc cgtaa 885

<210> 6
<211> 294
<212> PRT
<213> Streptococcus pyogenes

<400> 6

Met Ile Lys Arg Cys Lys Gly Ile Gly Leu Ala Leu Met Ala Phe Phe
1 5 10 15

Leu Val Ala Cys Val Asn Gln His Pro Lys Thr Ala Lys Glu Thr Glu
20 25 30

Gln Gln Arg Ile Val Ala Thr Ser Val Ala Val Val Asp Ile Cys Asp
35 40 45

Arg Leu Asn Leu Asp Leu Val Gly Val Cys Asp Ser Lys Leu Tyr Thr
50 55 60

Leu Pro Lys Arg Tyr Asp Ala Val Lys Arg Val Gly Leu Pro Met Asn
65 70 75 80

Pro Asp Ile Glu Leu Ile Ala Ser Leu Lys Pro Thr Trp Ile Leu Ser
85 90 95

Pro Asn Ser Leu Gln Glu Asp Leu Glu Pro Lys Tyr Gln Lys Leu Asp
100 105 110

Thr Glu Tyr Gly Phe Leu Asn Leu Arg Ser Val Glu Gly Met Tyr Gln
115 120 125

Ser Ile Asp Asp Leu Gly Asn Leu Phe Gln Arg Gln Gln Glu Ala Lys
130 135 140

Glu Leu Arg Gln Gln Tyr Gln Asp Tyr Tyr Arg Ala Phe Gln Ala Lys
145 150 155 160

Arg Lys Gly Lys Lys Lys Pro Lys Val Leu Ile Leu Met Gly Leu Pro
165 170 175

Gly Ser Tyr Leu Val Ala Thr Asn Gln Ser Tyr Val Gly Asn Leu Leu
180 185 190

Asp Leu Ala Gly Gly Glu Asn Val Tyr Gln Ser Asp Glu Lys Glu Phe
195 200 205

Leu Ser Ala Asn Pro Glu Asp Met Leu Ala Lys Glu Pro Asp Leu Ile
210 215 220

Leu Arg Thr Ala His Ala Ile Pro Asp Lys Val Lys Val Met Phe Asp
225 230 235 240

Lys Glu Phe Ala Glu Asn Asp Ile Trp Lys His Phe Thr Ala Val Lys
245 250 255

Glu Gly Lys Val Tyr Asp Leu Asp Asn Thr Leu Phe Gly Met Ser Ala
260 265 270

Lys Leu Asn Tyr Pro Glu Ala Leu Asp Thr Leu Thr Gln Leu Phe Asp
275 280 285

His Val Gly Asp His Pro
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<211> 34
<212> DNA
<213> Primer

<400> 7
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<210> 8
<211> 29
<212> DNA
<213> Primer

<400> 8

ccctcgagtt atttacctgt tttaccttc 29

<210> 9
<211> 31
<212> DNA
<213> Primer

<400> 9
aaggatccca tgtcacgtat tggtaataaa g 31

<210> 10
<211> 38
<212> DNA
<213> Primer

<400> 10
actagtcgac ttatttacct gttttacctt ctttaagg 38

<210> 11
<211> 35
<212> DNA
<213> Primer

<400> 11
ccttacaaag gcaaaggcat ccgttacgtt ggtga 35

<210> 12
<211> 35
<212> DNA
<213> Primer

<400> 12
tcaccaacgt aacggatgcc tttgcctttg taagg 35

<210> 13
<211> 30
<212> DNA
<213> Primer

<400> 13
tgtgtggttc atatgagcta cttgataatg 30

<210> 14
<211> 29
<212> DNA
<213> Primer

<400> 14
ccctcgagtt aaggtttaac aatacttcc 29

<210> 15
<211> 28
<212> DNA
<213> Primer

<400> 15
ggggatccct tgataatgaa ccatcaac 28

<210> 16
<211> 28
<212> DNA
<213> Primer

<400> 16
ccgtcgacgg tttaacaata cttcctac 28

<210> 17
<211> 33
<212> DNA
<213> Primer

<400> 17
ctttttggta catatggtga atcagcaccc taa 33

<210> 18
<211> 26
<212> DNA
<213> Primer

<400> 18
ccctcgagtt acggatgatc tcccac 26

<210> 19
<211> 28
<212> DNA
<213> Primer

<400> 19
gcggatccga atcagcaccc taaaacgg 28

<210> 20
<211> 28
<212> DNA
<213> Primer

<400> 20
ccgtcgacgg atgatctccc acgtggtc 28

<210> 21
<211> 537
<212> DNA

<213> Streptococcus pyogenes

<400> 21
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aacaatgtta ttactgttaa aggccctaaa ggcgaactca ctcgtgagtt taacaaaaat 120

attgaaatca aagttgaagg gactgaaatc acagttgtac gtcctaacga ctcaaaagaa 180

atgaaaacaa tccatggtac aacccgtgct aacttgaata acatggttgt aggtgtttct 240

gaaggtttca aaaaagatct tgaaatgaag ggtgtcggtt accgtgctca acttcaaggt 300

actaaacttg tcctttcagt aggtaaatct caccaagacg aagttgaagc tccagaagga 360

attactttca ctgttgctaa cccaacttca atctcagttg aaggaatcaa caaagaagtt 420

gttggtcaaa cagctgctta catccgtagc ttgcgttcac cagagcctta caaaggcaaa 480

gggatccgtt acgttggtga atacgtacgc cttaaagaag gtaaaacagg taaataa 537

<210> 22
<211> 178
<212> PRT
<213> Streptococcus pyogenes

<400> 22

Met Ser Arg Ile Gly Asn Lys Val Ile Thr Met Pro Ala Gly Val Glu
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Leu Thr Asn Asn Asn Asn Val Ile Thr Val Lys Gly Pro Lys Gly Glu
20 25 30

Leu Thr Arg Glu Phe Asn Lys Asn Ile Glu Ile Lys Val Glu Gly Thr
35 40 45

Glu Ile Thr Val Val Arg Pro Asn Asp Ser Lys Glu Met Lys Thr Ile
50 55 60

His Gly Thr Thr Arg Ala Asn Leu Asn Asn Met Val Val Gly Val Ser
65 70 75 80

Glu Gly Phe Lys Lys Asp Leu Glu Met Lys Gly Val Gly Tyr Arg Ala
85 90 95

Gln Leu Gln Gly Thr Lys Leu Val Leu Ser Val Gly Lys Ser His Gln
100 105 110

Asp Glu Val Glu Ala Pro Glu Gly Ile Thr Phe Thr Val Ala Asn Pro
115 120 125

Thr Ser Ile Ser Val Glu Gly Ile Asn Lys Glu Val Val Gly Gln Thr
130 135 140

Ala Ala Tyr Ile Arg Ser Leu Arg Ser Pro Glu Pro Tyr Lys Gly Lys
145 150 155 160

Gly Ile Arg Tyr Val Gly Glu Tyr Val Arg Leu Lys Glu Gly Lys Thr
165 170 175

Gly Lys

<210> 23
<211> 537
<212> DNA
<213> Streptococcus pyogenes

<400> 23
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attgaaatca aagttgaagg gactgaaatc acagttgtac gtcctaacga ctcaaaagaa 180

atgaaaacaa tccatggtac aacccgtgct aacttgaata acatggttgt aggtgtttct 240

gaaggtttca aaaaagatct tgaaatgaag ggtgtcggtt accgtgctca acttcaaggt 300

actaaacttg tcctttcagt aggtaaatct caccaagacg aagttgaagc tccagaagga 360

attactttca ctgttgctaa cccaacttca atctcagttg aaggaatcaa caaagaagtt 420

gttggtcaaa cagctgctta catccgtagc ttgcgttcac cagagcctta caaaggcaaa 480

gggatccgtt acgttggtga atacgtacgc cttaaagaag gtaaaacagg taaataa 537

<210> 24
<211> 178
<212> PRT
<213> Streptococcus pyogenes

<400> 24

Met Ser Arg Ile Gly Asn Lys Val Ile Thr Met Pro Ala Gly Val Glu
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Leu Thr Asn Asn Asn Asn Val Ile Thr Val Lys Gly Pro Lys Gly Glu

20 25 30

Leu Thr Arg Glu Phe Asn Lys Asn Ile Glu Ile Lys Val Glu Gly Thr
35 40 45

Glu Ile Thr Val Val Arg Pro Asn Asp Ser Lys Glu Met Lys Thr Ile
50 55 60

His Gly Thr Thr Arg Ala Asn Leu Asn Asn Met Val Val Gly Val Ser
65 70 75 80

Glu Gly Phe Lys Lys Asp Leu Glu Met Lys Gly Val Gly Tyr Arg Ala
85 90 95

Gln Leu Gln Gly Thr Lys Leu Val Leu Ser Val Gly Lys Ser His Gln
100 105 110

Asp Glu Val Glu Ala Pro Glu Gly Ile Thr Phe Thr Val Ala Asn Pro
115 120 125

Thr Ser Ile Ser Val Glu Gly Ile Asn Lys Glu Val Val Gly Gln Thr
130 135 140

Ala Ala Tyr Ile Arg Ser Leu Arg Ser Pro Glu Pro Tyr Lys Gly Lys
145 150 155 160

Gly Ile Arg Tyr Val Gly Glu Tyr Val Arg Leu Lys Glu Gly Lys Thr
165 170 175

Gly Lys

<210> 25
<211> 537
<212> DNA
<213> Streptococcus pyogenes

<400> 25
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attgaaatca aagttgaagg gactgaaatc acagttgtac gtcctaacga ctcaaaagaa 180

atgaaaacaa tccatgggac aacccgtgct aacttgaata acatggttgt aggtgtttct 240

gaaggtttca aaaaagatct tgaaatgaag ggtgtcggtt accgcgctca acttcaaggt 300

actaaacttg tcctttcagt aggtaaatct caccaagacg aagttgaagc tccagaagga 360

attactttca ctgttgctaa cccaacttca atctcagttg aaggaatcaa caaagaagtt 420

gttggtcaaa cagctgctta catccgtagc ttgcgttcac cagagcctta caaaggcaaa 480

gggatccgtt acgttggtga atacgtacgc cttaaagaag gtaaaacagg taaataa 537

<210> 26
<211> 178
<212> PRT
<213> Streptococcus pyogenes

<400> 26

Met Ser Arg Ile Gly Asn Lys Val Ile Thr Met Pro Ala Gly Val Glu
1 5 10 15

Leu Thr Asn Asn Asn Asn Val Ile Thr Val Lys Gly Pro Lys Gly Glu
20 25 30

Leu Thr Arg Glu Phe Asn Lys Asn Ile Glu Ile Lys Val Glu Gly Thr
35 40 45

Glu Ile Thr Val Val Arg Pro Asn Asp Ser Lys Glu Met Lys Thr Ile
50 55 60

His Gly Thr Thr Arg Ala Asn Leu Asn Asn Met Val Val Gly Val Ser
65 70 75 80

Glu Gly Phe Lys Lys Asp Leu Glu Met Lys Gly Val Gly Tyr Arg Ala
85 90 95

Gln Leu Gln Gly Thr Lys Leu Val Leu Ser Val Gly Lys Ser His Gln
100 105 110

Asp Glu Val Glu Ala Pro Glu Gly Ile Thr Phe Thr Val Ala Asn Pro
115 120 125

Thr Ser Ile Ser Val Glu Gly Ile Asn Lys Glu Val Val Gly Gln Thr
130 135 140

Ala Ala Tyr Ile Arg Ser Leu Arg Ser Pro Glu Pro Tyr Lys Gly Lys
145 150 155 160

Gly Ile Arg Tyr Val Gly Glu Tyr Val Arg Leu Lys Glu Gly Lys Thr
165 170 175

Gly Lys

<210> 27
<211> 537
<212> DNA
<213> Streptococcus pyogenes

<400> 27
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aacaatgtta ttactgttaa aggccctaaa ggcgaactca ctcgtgagtt caacaaaaat 120

attgaaatca aagttgaagg gactgaaatc acagttgtac gtcctaacga ctcaaaagaa 180

atgaaaacaa tccatggtac aacccgtgct aacttgaata acatggttgt aggtgtttct 240

gaaggtttca aaaaagatct tgaaatgaag ggtgtcggtt accgtgctca acttcaaggt 300

actaaacttg tcctttcagt aggtaaatct caccaagacg aagttgaagc tccagaagga 360

attactttca ctgttgctaa cccaacttca atctcagttg aaggaatcaa caaagaagtt 420

gttggtcaaa cagctgctta catccgtagc ttgcgttcac cagagcctta caaaggcaaa 480

gggatccgtt acgttggtga atacgtacgc cttaaagaag gtaaaacagg taaataa 537

<210> 28
<211> 178
<212> PRT
<213> Streptococcus pyogenes

<400> 28

Met Ser Arg Ile Gly Asn Lys Val Ile Thr Met Pro Ala Gly Val Glu
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Leu Thr Asn Asn Asn Asn Val Ile Thr Val Lys Gly Pro Lys Gly Glu
20 25 30

Leu Thr Arg Glu Phe Asn Lys Asn Ile Glu Ile Lys Val Glu Gly Thr
35 40 45

Glu Ile Thr Val Val Arg Pro Asn Asp Ser Lys Glu Met Lys Thr Ile
50 55 60

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His Gly Thr Thr Arg Ala Asn Leu Asn Asn Met Val Val Gly Val Ser
65                  70                  75                  80

Glu Gly Phe Lys Lys Asp Leu Glu Met Lys Gly Val Gly Tyr Arg Ala
                85                  90                  95

Gln Leu Gln Gly Thr Lys Leu Val Leu Ser Val Gly Lys Ser His Gln
            100                 105                 110

Asp Glu Val Glu Ala Pro Glu Gly Ile Thr Phe Thr Val Ala Asn Pro
        115                 120                 125

Thr Ser Ile Ser Val Glu Gly Ile Asn Lys Glu Val Val Gly Gln Thr
    130                 135                 140

Ala Ala Tyr Ile Arg Ser Leu Arg Ser Pro Glu Pro Tyr Lys Gly Lys
145                 150                 155                 160

Gly Ile Arg Tyr Val Gly Glu Tyr Val Arg Leu Lys Glu Gly Lys Thr
                165                 170                 175

Gly Lys
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<210> 29
<211> 1269
<212> DNA
<213> Streptococcus pyogenes

<400> 29

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tctagtgtca acaaagtaaa agccttaacc ataaaagaag ccatggaaca aggaaaagat    180

atcagcttga ccttagctgg cgaagtaaca gctaacaaca gcagcaaagt caaaatcgac    240

tcaagtaaag gagaagtcaa agaggtcttt gttaaaaaag gcgatgttgt caaagtagga    300

caaccccttgt ttagctatga aacgtcacag cggttaacgg ctcaaagttc agaatttgat    360

gttcaaacca aagccaatca gctccaagtt gctaaaacca atgcagcatt gaagtgggaa    420

acctacaatc gcaaggtcaa tgaaatcaac accctaaaat ctcgctacaa cactgcacca    480

gatgagagct tactagagca aattcgcagc gcagaagaca gtgtatccca agcactaagc    540

gatgccaaaa cagcagatag cgatgtcaaa accgctcaaa tcgaactcga taaagctaat    600
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gctactgcca caacggaaaa aggtaaacta gagtatgaca ccgttaagtc agacaccgca 660

ggaaccattg ttagtctaaa tactgatttg ccaaatcaat caaaatccaa aaaagaaaat 720

gaaactttta tggaaattat cgacaaatca aaaatgttag tcaaaggtaa cattagtgaa 780

tttgaccgtg acaagttaaa aatcggtcaa aaagtcgaag tgattgaccg caaagacaac 840

tctaaaaaat ggactggaaa agtaacccaa gttggcaacc tcaaagcaga ggaaaaaggc 900

caaggtcaag gccaaggtgg caatgaccaa caagataatc caaaccaagc aaaattccct 960

tatgttattg aacttgacca atcagacaag cagccactca ttggctcaca cacctatgtt 1020

aatgtactca acaatgttcc agaagctggc aagatcgtat tgaaagaaac ctttacaatg 1080

gcagaaaatg gaaaaaccta tgtgtggaaa gttgataaaa acaaggtcaa aaaacaagaa 1140

atcaagacta agcccttctc aaaaggttat gttgaggtaa caagtggctt gactatgcaa 1200

gataagattg ctcagccgct tcctggcatg aaagacggta tggaggtagg aagtattgtt 1260

aaaccttaa 1269

<210> 30
<211> 422
<212> PRT
<213> Streptococcus pyogenes

<400> 30

Met Phe Gln Leu Arg Lys Lys Met Thr Arg Lys Gln Leu Ala Leu Leu
1 5 10 15

Ser Ala Gly Val Leu Thr Cys Val Val Gly Gly Ser Tyr Leu Ile Met
20 25 30

Asn His Gln Gln Gln Glu Ile Val Ser Ser Val Asn Lys Val Lys Ala
35 40 45

Leu Thr Ile Lys Glu Ala Met Glu Gln Gly Lys Asp Ile Ser Leu Thr
50 55 60

Leu Ala Gly Glu Val Thr Ala Asn Asn Ser Ser Lys Val Lys Ile Asp
65 70 75 80

Ser Ser Lys Gly Glu Val Lys Glu Val Phe Val Lys Lys Gly Asp Val
85 90 95

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Val Lys Val Gly Gln Pro Leu Phe Ser Tyr Glu Thr Ser Gln Arg Leu
            100                 105                 110

Thr Ala Gln Ser Ser Glu Phe Asp Val Gln Thr Lys Ala Asn Gln Leu
        115                 120                 125

Gln Val Ala Lys Thr Asn Ala Ala Leu Lys Trp Glu Thr Tyr Asn Arg
    130                 135                 140

Lys Val Asn Glu Ile Asn Thr Leu Lys Ser Arg Tyr Asn Thr Ala Pro
145                 150                 155                 160

Asp Glu Ser Leu Leu Glu Gln Ile Arg Ser Ala Glu Asp Ser Val Ser
                165                 170                 175

Gln Ala Leu Ser Asp Ala Lys Thr Ala Asp Ser Asp Val Lys Thr Ala
            180                 185                 190

Gln Ile Glu Leu Asp Lys Ala Asn Ala Thr Ala Thr Thr Glu Lys Gly
        195                 200                 205

Lys Leu Glu Tyr Asp Thr Val Lys Ser Asp Thr Ala Gly Thr Ile Val
    210                 215                 220

Ser Leu Asn Thr Asp Leu Pro Asn Gln Ser Lys Ser Lys Lys Glu Asn
225                 230                 235                 240

Glu Thr Phe Met Glu Ile Ile Asp Lys Ser Lys Met Leu Val Lys Gly
                245                 250                 255

Asn Ile Ser Glu Phe Asp Arg Asp Lys Leu Lys Ile Gly Gln Lys Val
            260                 265                 270

Glu Val Ile Asp Arg Lys Asp Asn Ser Lys Lys Trp Thr Gly Lys Val
        275                 280                 285

Thr Gln Val Gly Asn Leu Lys Ala Glu Glu Lys Gly Gln Gly Gln Gly
    290                 295                 300

Gln Gly Gly Asn Asp Gln Gln Asp Asn Pro Asn Gln Ala Lys Phe Pro
305                 310                 315                 320

Tyr Val Ile Glu Leu Asp Gln Ser Asp Lys Gln Pro Leu Ile Gly Ser
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325 330 335

His Thr Tyr Val Asn Val Leu Asn Asn Val Pro Glu Ala Gly Lys Ile
340 345 350

Val Leu Lys Glu Thr Phe Thr Met Ala Glu Asn Gly Lys Thr Tyr Val
355 360 365

Trp Lys Val Asp Lys Asn Lys Val Lys Lys Gln Glu Ile Lys Thr Lys
370 375 380

Pro Phe Ser Lys Gly Tyr Val Glu Val Thr Ser Gly Leu Thr Met Gln
385 390 395 400

Asp Lys Ile Ala Gln Pro Leu Pro Gly Met Lys Asp Gly Met Glu Val
405 410 415

Gly Ser Ile Val Lys Pro
420

<210> 31
<211> 1269
<212> DNA
<213> Streptococcus pyogenes

<400> 31
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ttgacctgtg tggttggtgg tagctacttg ataatgaacc atcaacaaca agaaattgtc 120

tctagtgtca acaaagtaaa agccttaacc ataaaagaag ccatggaaca aggaaaagat 180

atcagcttga ccttagctgg cgaagtaaca gctaacaaca gcagcaaagt caaaatcgac 240

tcaagtaaag gagaagtcaa agaggtcttt gttaaaaaag gcgatgttgt caaagtagga 300

caacccttgt ttagctatga aacgtcacag cggttaacgg ctcaaagttc agaatttgat 360

gttcaaacca aagccaatca gctccaagtt gctaaaacca atgcagcatt gaagtgggaa 420

acctacaatc gcaaggtcaa tgaaatcaac accctaaaat ctcgctacaa cactgcacca 480

gatgagagct tactagagca aattcgcagc gcagaagaca gtgtatccca agcactaagc 540

gatgccaaaa cagcagatag cgatgtcaaa accgctcaaa tcgaactcga taaagctaat 600

gctactgcca caacggaaaa aggtaaacta gagtatgaca ccgttaagtc agacaccgca 660

ggaaccattg ttagtctaaa tactgatttg ccaaatcaat caaaatccaa aaaagaaaat 720

gaaactttta tggaaattat cgacaaatca aaaatgttag tcaaaggtaa cattagtgaa 780

tttgaccgtg acaagttaaa aatcggtcaa aaagtcgaag tgattgaccg caaagacaac 840

tctaaaaaat ggactggaaa agtaacccaa gttggcaacc tcaaagcaga ggaaaaaggc 900

caaggtcaag gccaaggtgg caatgaccaa caagataatc caaaccaagc aaaattccct 960

tatgttattg aacttgacca atcagacaag cagccactca ttggctcaca cacctatgtt 1020

aatgtactca acaatgttcc agaagctggc aagatcgtat tgaaagaaac ctttacaatg 1080

gcagaaaatg gaaaaaccta tgtgtggaaa gttgataaaa acaaggtcaa aaaacaagaa 1140

atcaagacta agcccttctc aaaaggttat gttgaggtaa caagtggctt gactatgcaa 1200

gataagattg ctcagccgct tcctggcatg aaagacggta tggaggtagg aagtattgtt 1260

aaaccttaa 1269

<210> 32
<211> 422
<212> PRT
<213> Streptococcus pyogenes

<400> 32

Met Phe Gln Leu Arg Lys Lys Met Thr Arg Lys Gln Leu Ala Leu Leu
1 5 10 15

Ser Ala Gly Val Leu Thr Cys Val Val Gly Gly Ser Tyr Leu Ile Met
20 25 30

Asn His Gln Gln Gln Glu Ile Val Ser Ser Val Asn Lys Val Lys Ala
35 40 45

Leu Thr Ile Lys Glu Ala Met Glu Gln Gly Lys Asp Ile Ser Leu Thr
50 55 60

Leu Ala Gly Glu Val Thr Ala Asn Asn Ser Ser Lys Val Lys Ile Asp
65 70 75 80

Ser Ser Lys Gly Glu Val Lys Glu Val Phe Val Lys Lys Gly Asp Val
85 90 95

Val Lys Val Gly Gln Pro Leu Phe Ser Tyr Glu Thr Ser Gln Arg Leu
100 105 110

Thr Ala Gln Ser Ser Glu Phe Asp Val Gln Thr Lys Ala Asn Gln Leu

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        115                 120                 125

Gln Val Ala Lys Thr Asn Ala Ala Leu Lys Trp Glu Thr Tyr Asn Arg
    130                 135                 140

Lys Val Asn Glu Ile Asn Thr Leu Lys Ser Arg Tyr Asn Thr Ala Pro
145                 150                 155                 160

Asp Glu Ser Leu Leu Glu Gln Ile Arg Ser Ala Glu Asp Ser Val Ser
                165                 170                 175

Gln Ala Leu Ser Asp Ala Lys Thr Ala Asp Ser Asp Val Lys Thr Ala
            180                 185                 190

Gln Ile Glu Leu Asp Lys Ala Asn Ala Thr Ala Thr Thr Glu Lys Gly
        195                 200                 205

Lys Leu Glu Tyr Asp Thr Val Lys Ser Asp Thr Ala Gly Thr Ile Val
    210                 215                 220

Ser Leu Asn Thr Asp Leu Pro Asn Gln Ser Lys Ser Lys Lys Glu Asn
225                 230                 235                 240

Glu Thr Phe Met Glu Ile Ile Asp Lys Ser Lys Met Leu Val Lys Gly
                245                 250                 255

Asn Ile Ser Glu Phe Asp Arg Asp Lys Leu Lys Ile Gly Gln Lys Val
            260                 265                 270

Glu Val Ile Asp Arg Lys Asp Asn Ser Lys Lys Trp Thr Gly Lys Val
        275                 280                 285

Thr Gln Val Gly Asn Leu Lys Ala Glu Glu Lys Gly Gln Gly Gln Gly
    290                 295                 300

Gln Gly Gly Asn Asp Gln Gln Asp Asn Pro Asn Gln Ala Lys Phe Pro
305                 310                 315                 320

Tyr Val Ile Glu Leu Asp Gln Ser Asp Lys Gln Pro Leu Ile Gly Ser
                325                 330                 335

His Thr Tyr Val Asn Val Leu Asn Asn Val Pro Glu Ala Gly Lys Ile
            340                 345                 350
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Val Leu Lys Glu Thr Phe Thr Met Ala Glu Asn Gly Lys Thr Tyr Val
355 360 365

Trp Lys Val Asp Lys Asn Lys Val Lys Lys Gln Glu Ile Lys Thr Lys
370 375 380

Pro Phe Ser Lys Gly Tyr Val Glu Val Thr Ser Gly Leu Thr Met Gln
385 390 395 400

Asp Lys Ile Ala Gln Pro Leu Pro Gly Met Lys Asp Gly Met Glu Val
405 410 415

Gly Ser Ile Val Lys Pro
420

<210> 33
<211> 1269
<212> DNA
<213> Streptococcus pyogenes

<400> 33
atgtttcagt taagaaaaaa aatgacgcgc aaacaattag ccttgttgag tgctggagtg 60

ttgacctgtg tggttggtgg tagctacttg ataatgaacc atcaacaaca agaagttgtc 120

tctagtgtca acaaagtaaa agccttaacc ataaaagaag ccatggaaca aggaaaagat 180

atcagcttga ccttagctgg cgaagtaaca gctaacaaca gcagcaaagt caaaatcgac 240

tcaagtaaag gagaagtcaa agaggtcttt gtcaaaaaag gcgatgttgt caaagtagga 300

caacccttgt ttagctatga aacgtcacag cggttaacgg ctcaaagttc agaatttgat 360

gttcaaacca aagccaatca actccaagtt gctaaaacca atgcagcatt gaagtgggaa 420

acctacaatc gcaaggtcaa tgaaatcaac accctaaaat ctcgctacaa cactgcacca 480

gatgagagct tactagagca aattcgcagc gcagaagaca gtgtatccca agcactaagc 540

gatgccaaaa cagcagatag cgatgtcaaa accgctcaaa tcgaactcga taaagctaat 600

gctactgcca caatggaaaa aggtaaacta gagtatgaca ccgttaagtc agacaccgca 660

ggaaccattg ttagcctaaa tactgatttg ccaaatcaat caaaatccaa aaaagaaaat 720

gaaactttta tggaaattat cgacaaatca aaaatgttag tcaaaggtaa catcagtgaa 780

tttgaccgtg acaagttaaa aatcgatcaa aaagtcgaag tgattgaccg caaagacaac 840

tctaaaaaat ggactggaaa agtaacccaa gttggcaacc tcaaagcaga ggaaaaaggc 900

caaggtcaag gccaaggtgg caatgaccaa caagacaatc caaaccaagc aaaattccct 960

tatgttatcg aacttgacca atcagacaag cagccactca ttggctcaca cacctatgtt 1020

aatgtgctca acaatgttcc agaagctggc aagatcgtat tgaaagaaac ctttacaatg 1080

gcagaaaatg gaaaaaccta tgtgtggaaa gttgataaaa acaaggtcaa aaaacaagaa 1140

atcaagacta agcccttctc aaaaggttat gttgaggtga caagtggctt gactatgcaa 1200

gataagattg ctcagccgct tcctggcatg aaagacggta tggaggtagg aagtattgtt 1260

aaaccttaa 1269

<210> 34
<211> 422
<212> PRT
<213> Streptococcus pyogenes

<400> 34

Met Phe Gln Leu Arg Lys Lys Met Thr Arg Lys Gln Leu Ala Leu Leu
1 5 10 15

Ser Ala Gly Val Leu Thr Cys Val Val Gly Gly Ser Tyr Leu Ile Met
20 25 30

Asn His Gln Gln Gln Glu Val Val Ser Ser Val Asn Lys Val Lys Ala
35 40 45

Leu Thr Ile Lys Glu Ala Met Glu Gln Gly Lys Asp Ile Ser Leu Thr
50 55 60

Leu Ala Gly Glu Val Thr Ala Asn Asn Ser Ser Lys Val Lys Ile Asp
65 70 75 80

Ser Ser Lys Gly Glu Val Lys Glu Val Phe Val Lys Lys Gly Asp Val
85 90 95

Val Lys Val Gly Gln Pro Leu Phe Ser Tyr Glu Thr Ser Gln Arg Leu
100 105 110

Thr Ala Gln Ser Ser Glu Phe Asp Val Gln Thr Lys Ala Asn Gln Leu
115 120 125

Gln Val Ala Lys Thr Asn Ala Ala Leu Lys Trp Glu Thr Tyr Asn Arg
130 135 140

```
Lys Val Asn Glu Ile Asn Thr Leu Lys Ser Arg Tyr Asn Thr Ala Pro
145                 150                 155                 160

Asp Glu Ser Leu Leu Glu Gln Ile Arg Ser Ala Glu Asp Ser Val Ser
                165                 170                 175

Gln Ala Leu Ser Asp Ala Lys Thr Ala Asp Ser Asp Val Lys Thr Ala
            180                 185                 190

Gln Ile Glu Leu Asp Lys Ala Asn Ala Thr Ala Thr Met Glu Lys Gly
        195                 200                 205

Lys Leu Glu Tyr Asp Thr Val Lys Ser Asp Thr Ala Gly Thr Ile Val
    210                 215                 220

Ser Leu Asn Thr Asp Leu Pro Asn Gln Ser Lys Ser Lys Lys Glu Asn
225                 230                 235                 240

Glu Thr Phe Met Glu Ile Ile Asp Lys Ser Lys Met Leu Val Lys Gly
                245                 250                 255

Asn Ile Ser Glu Phe Asp Arg Asp Lys Leu Lys Ile Asp Gln Lys Val
            260                 265                 270

Glu Val Ile Asp Arg Lys Asp Asn Ser Lys Lys Trp Thr Gly Lys Val
        275                 280                 285

Thr Gln Val Gly Asn Leu Lys Ala Glu Glu Lys Gly Gln Gly Gln Gly
    290                 295                 300

Gln Gly Gly Asn Asp Gln Gln Asp Asn Pro Asn Gln Ala Lys Phe Pro
305                 310                 315                 320

Tyr Val Ile Glu Leu Asp Gln Ser Asp Lys Gln Pro Leu Ile Gly Ser
                325                 330                 335

His Thr Tyr Val Asn Val Leu Asn Asn Val Pro Glu Ala Gly Lys Ile
            340                 345                 350

Val Leu Lys Glu Thr Phe Thr Met Ala Glu Asn Gly Lys Thr Tyr Val
        355                 360                 365
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Trp Lys Val Asp Lys Asn Lys Val Lys Lys Gln Glu Ile Lys Thr Lys
370 375 380

Pro Phe Ser Lys Gly Tyr Val Glu Val Thr Ser Gly Leu Thr Met Gln
385 390 395 400

Asp Lys Ile Ala Gln Pro Leu Pro Gly Met Lys Asp Gly Met Glu Val
405 410 415

Gly Ser Ile Val Lys Pro
420

<210> 35
<211> 1269
<212> DNA
<213> Streptococcus pyogenes

<400> 35
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ttgacctgtg tggttggtgg tacctacttg ataatgaatc atcaacaaca agaaattgtc 120

tctagtgtca acaaagtaaa agccttaacc ataaaagaag ccatggaaca aggaaaagat 180

atcagcttga ccttagctgg cgaagtaaca gctaacaaca gcagcaaagt caaaatcgac 240

tcaagtaaag gagaagtcaa agatgtcttt gtcaaaaaag gcgatgttgt caaagtagga 300

caacccttgt ttagctatga aacgtcacaa cggttaacgg ctcaaagttc agaatttgat 360

gttcaaacca aagccaatca actccaagtt gctaaaacca atgcagcatt gaagtgggaa 420

acctacaatc gcaaggtcaa tgaaatcaat accctaaaat ctcgctacaa cactgcacca 480

gatgagagct tactagagca aattcgcagc gcagaagaca gtgtatctca agcactaagc 540

gatgccaaaa cagcagatag cgatgtcaaa accgctcaaa tcgaactcga taaagctaat 600

gctactgccg caacggaaaa aggtaaacta gagtatgaca ccgttaagtc agacaccgca 660

ggaaccattg ttagtctaaa tactgatttg ccaaatcaat caaaatccaa aaaagaaaat 720

gaaactttta tggaaattat cgacaaatca aaaatgttag tcaaaggtaa catcagtgaa 780

tttgaccgtg acaagttaaa aatcgatcaa aaagtcgaag tgattgaccg caaagacaac 840

tctaaaaaat ggactggaaa agtaacccaa gttggcaacc tcaaagcaga ggaaaaaggc 900

caaggtcaag gccaaggtgg caatgaccaa caagataatc caaaccaagc aaaattccct 960

tatgttatcg aacttgacca atcagacaag cagccactca ttggttcaca cacctatgtt 1020

aatgtgctca acaatgttcc agaagctggc aagatcgtat tgaaagaaac ctttacaatg 1080

gcagaaaatg gaaaaaccta tgtgtggaaa gttgataaaa acaaggtcaa aaaacaagaa 1140

atcaagacta agcccttctc aaaaggttat gttgaggtga caagcggctt gactatgcaa 1200

gataagattg ctcagccgct tcctggcatg aaagacggta tggaggtagg aagtattgtt 1260

aaaccttaa 1269

<210> 36
<211> 422
<212> PRT
<213> Streptococcus pyogenes

<400> 36

Met Phe Gln Leu Arg Lys Lys Met Thr Arg Lys Gln Leu Ala Leu Leu
1 5 10 15

Ser Ala Gly Val Leu Thr Cys Val Val Gly Gly Thr Tyr Leu Ile Met
20 25 30

Asn His Gln Gln Gln Glu Ile Val Ser Ser Val Asn Lys Val Lys Ala
35 40 45

Leu Thr Ile Lys Glu Ala Met Glu Gln Gly Lys Asp Ile Ser Leu Thr
50 55 60

Leu Ala Gly Glu Val Thr Ala Asn Asn Ser Ser Lys Val Lys Ile Asp
65 70 75 80

Ser Ser Lys Gly Glu Val Lys Asp Val Phe Val Lys Lys Gly Asp Val
85 90 95

Val Lys Val Gly Gln Pro Leu Phe Ser Tyr Glu Thr Ser Gln Arg Leu
100 105 110

Thr Ala Gln Ser Ser Glu Phe Asp Val Gln Thr Lys Ala Asn Gln Leu
115 120 125

Gln Val Ala Lys Thr Asn Ala Ala Leu Lys Trp Glu Thr Tyr Asn Arg
130 135 140

Lys Val Asn Glu Ile Asn Thr Leu Lys Ser Arg Tyr Asn Thr Ala Pro
145 150 155 160

```
Asp Glu Ser Leu Leu Glu Gln Ile Arg Ser Ala Glu Asp Ser Val Ser
                165                 170                 175

Gln Ala Leu Ser Asp Ala Lys Thr Ala Asp Ser Asp Val Lys Thr Ala
            180                 185                 190

Gln Ile Glu Leu Asp Lys Ala Asn Ala Thr Ala Ala Thr Glu Lys Gly
        195                 200                 205

Lys Leu Glu Tyr Asp Thr Val Lys Ser Asp Thr Ala Gly Thr Ile Val
    210                 215                 220

Ser Leu Asn Thr Asp Leu Pro Asn Gln Ser Lys Ser Lys Lys Glu Asn
225                 230                 235                 240

Glu Thr Phe Met Glu Ile Ile Asp Lys Ser Lys Met Leu Val Lys Gly
                245                 250                 255

Asn Ile Ser Glu Phe Asp Arg Asp Lys Leu Lys Ile Asp Gln Lys Val
            260                 265                 270

Glu Val Ile Asp Arg Lys Asp Asn Ser Lys Lys Trp Thr Gly Lys Val
        275                 280                 285

Thr Gln Val Gly Asn Leu Lys Ala Glu Glu Lys Gly Gln Gly Gln Gly
    290                 295                 300

Gln Gly Gly Asn Asp Gln Gln Asp Asn Pro Asn Gln Ala Lys Phe Pro
305                 310                 315                 320

Tyr Val Ile Glu Leu Asp Gln Ser Asp Lys Gln Pro Leu Ile Gly Ser
                325                 330                 335

His Thr Tyr Val Asn Val Leu Asn Asn Val Pro Glu Ala Gly Lys Ile
            340                 345                 350

Val Leu Lys Glu Thr Phe Thr Met Ala Glu Asn Gly Lys Thr Tyr Val
        355                 360                 365

Trp Lys Val Asp Lys Asn Lys Val Lys Lys Gln Glu Ile Lys Thr Lys
    370                 375                 380
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Pro Phe Ser Lys Gly Tyr Val Glu Val Thr Ser Gly Leu Thr Met Gln
385                 390                 395                 400

Asp Lys Ile Ala Gln Pro Leu Pro Gly Met Lys Asp Gly Met Glu Val
                405                 410                 415

Gly Ser Ile Val Lys Pro
            420
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<210> 37
<211> 885
<212> DNA
<213> Streptococcus pyogenes

<400> 37

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atgataaaac gatgtaaagg aattggtcta gtcttaatgg ccttcttttt ggtagcttgt     60

gtaaatcagc accctaaaac ggctaaagag actgaacagc agagaattgt agccacttcg    120

gttgctgtgg ttgatatctg tgaccgttta aatttagacc tcgttggggt ttgtgatagt    180

aaattatata cccttcctaa acgctatgat gctgttaagc gtgtgggttt acccatgaat    240

cctgatatag agttgattgc ttctttgaaa ccaacttgga ttttgagtcc caattcttta    300

caagaagatt tggaacccaa gtatcaaaaa ttggatactg agtatggttt tttgaactta    360

cgaagtgttg agggcatgta ccagtctatt gatgatttag ggaacctttt ccaacgtcaa    420

caagaagcaa aagaattgcg ccagcaatac caggactatt atcgtgcttt ccaagctaaa    480

cgcaagggga agaaaaagcc taaagtgctt attcttatgg gcttgccagg tagttatttg    540

gtggcgacga accaatctta tgtagggaat cttttggact tggcaggtgg tgagaatgtt    600

tatcagtcag atgagaaaga atttctatca gttaatcctg aagacatgct agctaaggag    660

cctgacttga ttttacgaac agctcacgcc attccagaca aggtaaaagt gatgtttgac    720

aaagaatttg ctgaaaatga tatttggaaa cattttacgg cagtcaagga agggaaagtc    780

tatgatttgg acaataccct gtttggcatg agtgctaaat tgaactaccc agaagccttg    840

gacaccttaa cacagctttt tgaccacgtg ggagatcatc cgtaa                    885
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<210> 38
<211> 294
<212> PRT
<213> Streptococcus pyogenes

<400> 38

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Met Ile Lys Arg Cys Lys Gly Ile Gly Leu Val Leu Met Ala Phe Phe
```

1 5 10 15

Leu Val Ala Cys Val Asn Gln His Pro Lys Thr Ala Lys Glu Thr Glu
20 25 30

Gln Gln Arg Ile Val Ala Thr Ser Val Ala Val Val Asp Ile Cys Asp
35 40 45

Arg Leu Asn Leu Asp Leu Val Gly Val Cys Asp Ser Lys Leu Tyr Thr
50 55 60

Leu Pro Lys Arg Tyr Asp Ala Val Lys Arg Val Gly Leu Pro Met Asn
65 70 75 80

Pro Asp Ile Glu Leu Ile Ala Ser Leu Lys Pro Thr Trp Ile Leu Ser
85 90 95

Pro Asn Ser Leu Gln Glu Asp Leu Glu Pro Lys Tyr Gln Lys Leu Asp
100 105 110

Thr Glu Tyr Gly Phe Leu Asn Leu Arg Ser Val Glu Gly Met Tyr Gln
115 120 125

Ser Ile Asp Asp Leu Gly Asn Leu Phe Gln Arg Gln Gln Glu Ala Lys
130 135 140

Glu Leu Arg Gln Gln Tyr Gln Asp Tyr Tyr Arg Ala Phe Gln Ala Lys
145 150 155 160

Arg Lys Gly Lys Lys Lys Pro Lys Val Leu Ile Leu Met Gly Leu Pro
165 170 175

Gly Ser Tyr Leu Val Ala Thr Asn Gln Ser Tyr Val Gly Asn Leu Leu
180 185 190

Asp Leu Ala Gly Gly Glu Asn Val Tyr Gln Ser Asp Glu Lys Glu Phe
195 200 205

Leu Ser Val Asn Pro Glu Asp Met Leu Ala Lys Glu Pro Asp Leu Ile
210 215 220

Leu Arg Thr Ala His Ala Ile Pro Asp Lys Val Lys Val Met Phe Asp
225 230 235 240

Lys Glu Phe Ala Glu Asn Asp Ile Trp Lys His Phe Thr Ala Val Lys
245 250 255

Glu Gly Lys Val Tyr Asp Leu Asp Asn Thr Leu Phe Gly Met Ser Ala
260 265 270

Lys Leu Asn Tyr Pro Glu Ala Leu Asp Thr Leu Thr Gln Leu Phe Asp
275 280 285

His Val Gly Asp His Pro
290

<210> 39
<211> 885
<212> DNA
<213> Streptococcus pyogenes

<400> 39
atgataaaac gatgtaaagg aattggtcta gtcttaatgg ccttcttttt ggtagcttgt 60

gtaaatcagc accctaaaac ggctaaagag actgaacagc agagaattgt agccacttcg 120

gttgctgtgg ttgatatctg tgaccgttta aatttagacc tcgttggggt ttgtgatagt 180

aaattatata cccttcctaa acgctatgat gctgttaagc gtgtgggttt acccatgaat 240

cctgatatag agttgattgc ttctttgaaa ccaacttgga ttttgagtcc caattcttta 300

caagaagatt tggaacccaa gtatcaaaaa ttggatactg agtatggttt tttgaactta 360

cgaagtgttg agggcatgta ccagtctatt gatgatttag ggaacctttt ccaacgtcaa 420

caagaagcaa aagaattgcg ccagcaatac caggactatt atcgtgcttt ccaagctaaa 480

cgcaagggga agaaaaagcc taaagtgctt attcttatgg gcttgccagg tagttatttg 540

gtggcgacga accaatctta tgtagggaat cttttggact tggcaggtgg tgagaatgtt 600

tatcagtcag atgagaaaga atttctatca gttaatcctg aagacatgct agctaaggag 660

cctgacttga ttttacgaac agctcacgcc attccagaca aggtaaaagt gatgtttgac 720

aaagaatttg ctgaaaatga tatttggaaa cattttacgg cagtcaagga agggaaagtc 780

tatgatttgg acaataccct gtttggcatg agtgctaaat tgaactaccc agaagccttg 840

gacaccttaa cacagctttt tgaccacgtg ggagatcatc cgtaa 885

<210> 40
<211> 294

<212> PRT
<213> Streptococcus pyogenes

<400> 40

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Met Ile Lys Arg Cys Lys Gly Ile Gly Leu Val Leu Met Ala Phe Phe
1               5                  10                  15

Leu Val Ala Cys Val Asn Gln His Pro Lys Thr Ala Lys Glu Thr Glu
            20                  25                  30

Gln Gln Arg Ile Val Ala Thr Ser Val Ala Val Val Asp Ile Cys Asp
        35                  40                  45

Arg Leu Asn Leu Asp Leu Val Gly Val Cys Asp Ser Lys Leu Tyr Thr
    50                  55                  60

Leu Pro Lys Arg Tyr Asp Ala Val Lys Arg Val Gly Leu Pro Met Asn
65                  70                  75                  80

Pro Asp Ile Glu Leu Ile Ala Ser Leu Lys Pro Thr Trp Ile Leu Ser
                85                  90                  95

Pro Asn Ser Leu Gln Glu Asp Leu Glu Pro Lys Tyr Gln Lys Leu Asp
            100                 105                 110

Thr Glu Tyr Gly Phe Leu Asn Leu Arg Ser Val Glu Gly Met Tyr Gln
        115                 120                 125

Ser Ile Asp Asp Leu Gly Asn Leu Phe Gln Arg Gln Gln Glu Ala Lys
    130                 135                 140

Glu Leu Arg Gln Gln Tyr Gln Asp Tyr Tyr Arg Ala Phe Gln Ala Lys
145                 150                 155                 160

Arg Lys Gly Lys Lys Lys Pro Lys Val Leu Ile Leu Met Gly Leu Pro
                165                 170                 175

Gly Ser Tyr Leu Val Ala Thr Asn Gln Ser Tyr Val Gly Asn Leu Leu
            180                 185                 190

Asp Leu Ala Gly Gly Glu Asn Val Tyr Gln Ser Asp Glu Lys Glu Phe
        195                 200                 205
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Leu Ser Val Asn Pro Glu Asp Met Leu Ala Lys Glu Pro Asp Leu Ile
210 215 220

Leu Arg Thr Ala His Ala Ile Pro Asp Lys Val Lys Val Met Phe Asp
225 230 235 240

Lys Glu Phe Ala Glu Asn Asp Ile Trp Lys His Phe Thr Ala Val Lys
245 250 255

Glu Gly Lys Val Tyr Asp Leu Asp Asn Thr Leu Phe Gly Met Ser Ala
260 265 270

Lys Leu Asn Tyr Pro Glu Ala Leu Asp Thr Leu Thr Gln Leu Phe Asp
275 280 285

His Val Gly Asp His Pro
290

<210> 41
<211> 885
<212> DNA
<213> Streptococcus pyogenes

<400> 41
atgataaaac gatgtaaagg aattggtcta gccttaatgg ccttcttttt ggtagcttgt 60

gtgaatcagc accctaaaac ggctaaagag actgaacagc agagaattgt agccacttcg 120

gttgctgtgg ttgatatctg tgaccgttta aatttagacc tcgttggggt ttgtgatagt 180

aaattatata cccttcctaa acgctatgat gctgttaagc gtgtgggttt acccatgaat 240

cctgatatag agttgattgc ttctttgaaa ccaacttgga ttttgagtcc caattcttta 300

caagaagatt tggaacccaa gtatcaaaaa ttggatactg agtatggttt tttgaactta 360

cgaagtgttg agggcatgta ccagtccatt gatgatttag ggaacctttt ccaacgtcaa 420

caagaagcaa aagaattgcg ccagcaatac caggactatt atcgtgcttt ccaagctaaa 480

cgtaagggga agaaaaagcc taaagtgctt attcttatgg gcttgccagg tagttatttg 540

gtggcgacga accaatctta tgtagggaat cttttggatt tggcaggtgg tgagaatgtt 600

tatcagtcag atgagaaaga atttctatca gctaatcctg aagacatgct ggctaaggag 660

cctgatttga ttttacgaac agctcacgcc attccagaca aggtaaaagt gatgtttgac 720

aaagaatttg ctgaaaatga tatttggaaa cattttacgg cagtcaagga agggaaagtc 780

tatgatttgg acaataccct gtttggcatg agtgctaaat tgaactaccc agaagccttg 840

gacaccttaa cacagctttt tgaccgcgtg ggagatcatc cgtaa 885

<210> 42
<211> 294
<212> PRT
<213> Streptococcus pyogenes

<400> 42

Met Ile Lys Arg Cys Lys Gly Ile Gly Leu Ala Leu Met Ala Phe Phe
1 5 10 15

Leu Val Ala Cys Val Asn Gln His Pro Lys Thr Ala Lys Glu Thr Glu
20 25 30

Gln Gln Arg Ile Val Ala Thr Ser Val Ala Val Val Asp Ile Cys Asp
35 40 45

Arg Leu Asn Leu Asp Leu Val Gly Val Cys Asp Ser Lys Leu Tyr Thr
50 55 60

Leu Pro Lys Arg Tyr Asp Ala Val Lys Arg Val Gly Leu Pro Met Asn
65 70 75 80

Pro Asp Ile Glu Leu Ile Ala Ser Leu Lys Pro Thr Trp Ile Leu Ser
85 90 95

Pro Asn Ser Leu Gln Glu Asp Leu Glu Pro Lys Tyr Gln Lys Leu Asp
100 105 110

Thr Glu Tyr Gly Phe Leu Asn Leu Arg Ser Val Glu Gly Met Tyr Gln
115 120 125

Ser Ile Asp Asp Leu Gly Asn Leu Phe Gln Arg Gln Gln Glu Ala Lys
130 135 140

Glu Leu Arg Gln Gln Tyr Gln Asp Tyr Tyr Arg Ala Phe Gln Ala Lys
145 150 155 160

Arg Lys Gly Lys Lys Lys Pro Lys Val Leu Ile Leu Met Gly Leu Pro
165 170 175

Gly Ser Tyr Leu Val Ala Thr Asn Gln Ser Tyr Val Gly Asn Leu Leu
180 185 190

Asp Leu Ala Gly Gly Glu Asn Val Tyr Gln Ser Asp Glu Lys Glu Phe
195 200 205

Leu Ser Ala Asn Pro Glu Asp Met Leu Ala Lys Glu Pro Asp Leu Ile
210 215 220

Leu Arg Thr Ala His Ala Ile Pro Asp Lys Val Lys Val Met Phe Asp
225 230 235 240

Lys Glu Phe Ala Glu Asn Asp Ile Trp Lys His Phe Thr Ala Val Lys
245 250 255

Glu Gly Lys Val Tyr Asp Leu Asp Asn Thr Leu Phe Gly Met Ser Ala
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Lys Leu Asn Tyr Pro Glu Ala Leu Asp Thr Leu Thr Gln Leu Phe Asp
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Arg Val Gly Asp His Pro
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gttgctgtgg ttgatatctg tgaccgttta aatttagacc tcgttggggt ttgtgatagt 180

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cctgatatag agttgattgc ttctttgaaa ccaacttgga ttttgagtcc caattcttta 300

caagaagatt tggaacccaa gtatcaaaaa ttggatactg agtatggttt tttgaactta 360

cgaagtgttg agggcatgta ccagtctatt gatgatttag ggaacctttt ccaacgtcaa 420

caagaagcaa aagaattgcg ccagcaatac caggactatt atcgtgcttt ccaagctaaa 480

cgtaagggga agaaaaagcc taaagtgctt attcttatgg gcttgccagg tagttatttg 540

gtggcgacga accaatctta tgtagggaat cttttggact tggcaggtgg tgagaatgtt 600

tatcagtcag atgagaaaga atttctatca gttaatcctg aagacatgct agctaaggag 660

cctgacttga ttttacgaac agctcacgcc attccagaca aggtaaaagt gatgtttgac 720

aaagaatttg ctgaaaatga tatttggaaa cattttacgg cagtcaagga agggaaagtc 780

tatgatttgg acaataccct gtttggcatg agtgctaaat tgaactaccc agaagccttg 840

gacaccttaa cacagctttt tgaccacgtg ggagatcatc cgtaa 885

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<213> Streptococcus pyogenes

<400> 44

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Leu Val Ala Cys Val Asn Gln His Pro Lys Thr Ala Lys Glu Thr Glu
20 25 30

Gln Gln Arg Ile Val Ala Thr Ser Val Ala Val Val Asp Ile Cys Asp
35 40 45

Arg Leu Asn Leu Asp Leu Val Gly Val Cys Asp Ser Lys Leu Tyr Thr
50 55 60

Leu Pro Lys Arg Tyr Asp Ala Val Lys Arg Val Gly Leu Pro Met Asn
65 70 75 80

Pro Asp Ile Glu Leu Ile Ala Ser Leu Lys Pro Thr Trp Ile Leu Ser
85 90 95

Pro Asn Ser Leu Gln Glu Asp Leu Glu Pro Lys Tyr Gln Lys Leu Asp
100 105 110

Thr Glu Tyr Gly Phe Leu Asn Leu Arg Ser Val Glu Gly Met Tyr Gln
115 120 125

Ser Ile Asp Asp Leu Gly Asn Leu Phe Gln Arg Gln Gln Glu Ala Lys
130 135 140

Glu Leu Arg Gln Gln Tyr Gln Asp Tyr Tyr Arg Ala Phe Gln Ala Lys
145 150 155 160

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Arg Lys Gly Lys Lys Lys Pro Lys Val Leu Ile Leu Met Gly Leu Pro
                165                 170                 175

Gly Ser Tyr Leu Val Ala Thr Asn Gln Ser Tyr Val Gly Asn Leu Leu
            180                 185                 190

Asp Leu Ala Gly Gly Glu Asn Val Tyr Gln Ser Asp Glu Lys Glu Phe
        195                 200                 205

Leu Ser Val Asn Pro Glu Asp Met Leu Ala Lys Glu Pro Asp Leu Ile
    210                 215                 220

Leu Arg Thr Ala His Ala Ile Pro Asp Lys Val Lys Val Met Phe Asp
225                 230                 235                 240

Lys Glu Phe Ala Glu Asn Asp Ile Trp Lys His Phe Thr Ala Val Lys
                245                 250                 255

Glu Gly Lys Val Tyr Asp Leu Asp Asn Thr Leu Phe Gly Met Ser Ala
            260                 265                 270

Lys Leu Asn Tyr Pro Glu Ala Leu Asp Thr Leu Thr Gln Leu Phe Asp
        275                 280                 285

His Val Gly Asp His Pro
    290
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